



EFFECT OF RECYCLING PROCESS TO THE PHYSICAL AND MECHANICAL PROPERTIES OF POLYPROPYLENE

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DECLARATION BY CANDIDATE

“I declare that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any degree.”

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SUPERVISOR CERTIFICATION

“I declared that I read this thesis and in our point of view this thesis is qualified in term of scope and quality for the purpose of awarding the Bachelor of Mechanical Engineering (Manufacturing) (Hons)”

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ABSTRACT

Polypropylene is a versatile material as it is used in variety application such as personal protective equipment (PPE), food packaging, automotive part and household. At the same time, there is a huge increment in plastic waste in the world and causing the seriousness of environmental pollution. For that reasons, industries have defined many ways to recycle plastic materials mainly to resolve the environment pollution. This study aims to investigate the maximum cycles can be sustained by the polypropylene as well as maintains its physical and mechanical performance. Previous findings showed the study up to 9th cycles of polypropylene. Hence, this study investigated the recycled polypropylene from 10 to 14 times using injection molding process. The injected products were tested by the tensile and flexural test. The specimens were also studied on their shrinkage and appearance. From the results, it is found that the tensile and flexural strength of polypropylene managed to sustain above 30 MPa even at fourteenth cycles. The bending modulus was secured at least 1.0 GPa for the polypropylene. Both results were very closed to the properties of the pure polypropylene. Besides, the recycled polypropylene resisted to more loading in bending mode rather than the longitudinal tension mode. The percentage of shrinkage was less than 3%, which showed the dimensional stability of the recycled polypropylene. The output from this study can contribute to the development of recycled plastic and effort in saving the world from plastic pollution.